

F77L REPORT

SEPTEMBER 1989

FORTRAN SEMINARS

Tom Lahey will be the principal speaker at the FORTRAN seminars being presented in the major cities of Australia and New Zealand between October 16 and November 15. Tom is an excellent speaker and has an extensive background in FORTRAN and FORTRAN compiler writing. His July 1987 seminars were very well received. All FORTRAN programmers - not just Lahey users - will find the 1989 seminars most worthwhile. They will be a rare opportunity for FORTRAN users to meet, exchange ideas, and obtain information on current developments which will be of direct benefit to their work.

The accompanying brochure provides details for the seminars. Early registration particularly by those wishing to attend the seminar in Canberra is encouraged. The Canberra event will only take place if there is sufficient response.

F77LEM/32 VERSION 2.0

F77LEM/32 version 2.0 has been released. New features include Weitek math chip support, faster execution, video graphics, DEC and VAX FORTRAN intrinsic and new documentation.

The video graphics routines are the same as those in F77L version 4. The following capabilities (calcomp compatible) are provided - initialization, clear screen, set colour, draw line, draw circle, set a pixel, examine a pixel, fill a bounded area, display text, and change user coordinates.

F77L VERSION 4

Version 4 of F77L will be available in early October. We strongly recommend that all current F77L users upgrade.

A debugger and a library manager were provided in Version 3. F77L now comes with a comprehensive programming environment which will substantially improve the productivity of all F77L users. Included are a fast linker, an integrated editor, a make utility, and the Lahey Profiler (previously a 300 separate product).

The linker operates six times faster than Microsoft LINK and will consequently save substantial time for everyone using F77L. The second major operational advantage of Version 4 is the integrated FORTRAN specific editor. (enables the user, at a cost of 1K of memory) to link and execute programs without leaving the editor. The editor can be configured so that those who are used to another editor may continue to use familiar key stroke sequences.

Additional new features in Version 4 include primitive CGA, EGA, VGA, and Hercules screen graphics, DO WHILE, END DO, production of faster code, Weitek support, 80386 switch, Turbo C 2.0 interface, and a new manual.

The upgrade to Version 4 is \$200 (based on A\$ = US\$.75) for version 3 users and \$240 for version 2 users. Those who purchased version 3.0 after June 30, 1989 may upgrade to version 4.0 for \$150. The complete set of original F77L disks must be sent to Computer Transition Systems before Version 4.0 updates will be shipped. The US price of F77L version 4 is \$595. The Australian price is now \$800.

LAHEY COMPILER OPTIONS

The best options to use with the various Lahey compilers were presented at Users Meeting held at Incline Village in May.

Options for protection against bugs

F77LEM/16 /W/O/B/I/R/P/L protected mode is very helpful

F77LEM/32 /B/I/W/O/R/P/L protected mode is of some help

F77L /B/I/W/O/R/P/L

Options for production of smallest code size

F77L /T/NL/NB/NI/3/2/A/A1/NR/Z1/NP

F77LEM/16 /T/NL/NB/NI/A/A1/NR/Z1/NP

F77LEM/32 /NL/T/NB/NI/Z1/NP Options for fast execution speed

Integer Arithmetic

F77LEM/32 /NB/NI/Z1/NP/NT always fast

F77L /3/T/NB/NI/Z1/2/NP

F77LEM/16 /T/NB/NI/Z1/NP

Floating Point Arithmetic

F77LEM/32 /K/NB/NI/NQ1/Z1/NP /K is Weitek

F77L /K/3/2/NE/NB/NI/Z1/NP

F77LEM/16 /NB/NI/Z1/NP

Arrays greater than 64K bytes

F77LEM/32 /NB/NI/Z1 always fastest by far

F77L /3/NB/2/NI/Z1

F77LEM/16 /NB/NI/Z1

In each of the above the product listed first has the greatest effect. In each of the above the option listed first has the greatest effect.

COMPUTER TRANSITION SYSTEMS, BOX 4553, MELBOURNE, VICTORIA, 3001

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WEITEK PERFORMANCE

Both F77L and F77LEM/32 can now make use of the Wietek chip instead of the 80387. The extra performance provided by the Weitek chip over that obtained when using an 80387 is program dependant. Our own preliminary tests which were carried out mainly on various benchmark programs gave execution time ratios between 1.3 and 2.0 with 1.6 being typical. The first reports we have received from Australian F77LEM/32 users on their actual programs gave ratios of 2. In none of these cases does I/O play a significant role. The Weitek is purely a floating point accelerator and so only floating point arithmetic is assisted by the Weitek chip. Current tax free prices for the Weitek chip from Computer Transition Systems are \$940, \$1340, 1740, and \$2250 for the 16, 20, 25 and 33 Mhz parts respectively.

80386 MOTHERBOARDS

We have purchased an 80386 based PC from Companion Computers (03) 8888228. This hardware should be of interest to those who want high performance at reasonable cost. The motherboard can be purchased separately and used to upgrade AT PCs to 80386 operation. CPU speed is 25 MHz. It uses AUSTEK's A38152 which is a 32KB 4 way set associative cache controller chip. This delivers performance superior to page mode interleaved memory systems and almost equal to that of the very costly SRAM based memory systems. Other features of the motherboard include Weitek support, up to 16MB of ram on board, 6 sixteen bit bus slots, 2 eight bit bus slots, and AMI BIOS. Tax free prices are about A\$3800 for the 4MB version of the board. Computer Transition Systems does not sell the motherboard but we are happy to provide 80387 chips, Weitek chips, and daughter boards which both math chips to reside simultaneously on the motherboard.

NEW PRODUCTS

FOR_C++ Cobalt Blue's excellent FORTRAN77 to C source code translator is now available for 386 base UNIX systems and a new version translates to C++ as well as C. If you have 2000 or more lines of FORTRAN which you would like to translate into C then FOR_C more than pays for itself.

RTLINK - \$430 This linker is less expensive than PLINK86+ and is at least as effective in carrying out overlay linking. It has the additional advantage of being able to allow your DOS programs to do runtime linking. This will dramatically decrease the size of your executable files.

HISCREEN XL - \$520 (\$235 standard version) HISCREEN XL allows interactive design of screens and windows for almost any language. Can be used for menu systems and data entry screens.

SCIENTIFIC DESK - \$520 Version 4 of this comprehensive mathematical library has now been released. A F77LEM/32 version is available.

AUTOMATED PROGRAMMER - \$850 The Automated Programmer automatically generates FORTRAN programs from computational formulas or algorithms directly entered from books or other reference sources. This approach greatly speeds up program development and substantially reduces the incidence of coding errors.

UNIX

Computer Transition Systems can supply NDP FORTRAN for 80386 hardware running under UNIX. The cost is \$1250. Australian users report that the NDP compiler is robust and generates programs which execute fast. No debugger is provided with this compiler.

An excellent static analyser, FLINT, is available for all UNIX systems. Those who work with large FORTRAN programs (50,000 lines) will find FLINT an invaluable tool for maintaining, porting, or developing code. Prices begin at \$4000

A Unix version of the FOR_C source code translator is available. Pricing for 80386 hardware is \$1350. A version which converts FORTRAN to C++ as well as C costs \$2520.

By the end of the year there will be a PL1250 array processor library for 80386 hardware running under UNIX. Anyone interested in this product should advise Computer Transition Systems.

MULTIUSER FORTRAN

Transware Enterprises has ported F77LEM/32 to Digital Research's multiuser multitasking operating system FLEXOS 386. A complete package (compiler plus operating system) costs US\$2272. This provides for an unlimited number of users. Further information may be obtained directly from Dean Jones of Transware on (408) 723 2102. In November a port of F77L to Concurrent DOS should be released.

PROGRAMMING TIP

A terminal is very useful when you are trying to debug graphics programs. If SOLD output is redirected to the terminal your normal graphics screen is not disturbed by SOLD's operation.

8X UPDATE

Both the European and US FORTRAN committees reached agreement last month. What is expected to be the last public review of the next FORTRAN standard ends in November. Lahey Computer Systems have produced a reprint of the current state of the FORTRAN 8X standard. A limited number of copies are available from Computer Transition Systems at cost - \$35 inclusive of shipping. Attendees at the FORTRAN seminars will receive a precis of the proposed standard.

i860

According to Intel their new RISC chip, the i860, formally known as the N10, should provide substantially greater performance than the just released 80486 and the competing MIPS and SPARC RISC chips. The i860 instruction set is designed for fast integer, floating point, and 3D graphics calculations. Memory management, data caches and instruction cache are included on the chip. With the i860 the double precision Linpac benchmarks run at 10 MFLOPS using DRAM memory and no external cache. The best 25 MHz 80386/80387 Linpac results are less than .25 MFLOP. It will probably be a year before complete i860 systems appear. AT bus cards using the i860 have been produced in limited quantities. Lahey is completing the port of their FORTRAN compiler to the i860 running under OS/2. Users who have very high performance FORTRAN requirements should contact Computer Transition Systems for the latest information on i860 hardware and software.

FASTER MATH CHIPS

Chips which are operationally identical to but faster than 80287 and 80387 chips have been developed. The extra performance is achieved by carrying out the standard math chip operations in fewer clock cycles. The 80287 equivalents are about 200% faster and the 80387 equivalents are about 50% faster than the Intel chips. Currently only the 80287 clone, the IIT2C87, is available. There are two versions - the 10 MHz (\$385 + tax) and the 20 MHz (\$595). Very few 80286 machines are designed to operate the 80287 at 20 MHz. Some exceptions are the EVEREX, Dell, and Compuadd. With other 20 MHz AT's a simple motherboard modification, namely providing the cpu clock signal to the math chip, is required to make full use of the 20 MHz part. The 80387 clone chip should be available in November.

IBM AT TO 80386 CONVERSION

Users of genuine IBM AT machines can easily convert their hardware to 80386 operation. The IBM AT, unlike AT compatibles, uses a square grid array CPU chip. This may be unplugged and a 80386 daughter board fitted in its place. 16 Mhz (\$750 + tax) and 25 MHz (\$1000) versions are available. These products will allow 32 bit software to be executed on AT machines. They will also increase the execution speed of numerically intensive MSDOS software. Note that memory still operates at the original motherboard speed so the performance of non numerical operations will not be improved. A socket is provided for a 80387. Alternatively one can use the socket on the motherboard for an 80287.

C INTERFACE

One session at the Lahey User Meeting dealt with interfacing C subroutines into FORTRAN. Reprints of overheads for this talk are available from Computer Transition Systems upon request.

A to D HARDWARE/SOFTWARE

A complete range of analog to digital hardware is produced by Scientific Solutions. These products are very competitive technically with those produced by Data Translation. Their cost is substantially less. Comprehensive F77L compatible software is available for Scientific Solutions hardware. Scientific Solutions are represented in Australia by Laboratory Software Associates, Suite 12, 35 Gertrude St, Fitzroy, Vic 3065. Phone (03) 419 7400.

NEW FORTRAN BOOKS

"A Guidebook to FORTRAN on Supercomputers" by Levesque and Williamson, Academic Press 1988. \$76.25 The book includes hints on restructuring to permit full optimisation.

"Introduction to Parallel Programming" by Brawer, Academic Press 1989. \$76.25 Examples in a subset of FORTRAN are provided.

"FORTRAN Tools for VAX/VMS and MSDOS" by Jones and Crabtree, John Wiley 1988. \$74.90 Topics covered include how to translate VAX extensions into standard FORTRAN, how to systematically subdivide large problems, and how to design FORTRAN programs around data structures.

"Modern FORTRAN77 for Scientists and Engineers" by Worland, HBJ 1989.

"Advanced Problem Solving with FORTRAN77" by Edgar, Grossman 1989. Topics covered include advanced data structures, sorting and searching, numerical methods, graphics, simulation and expert systems.

RECOMMENDED BOOKS

"Numerical Recipes" by Press et al, Cambridge University Press, 1986 \$89.50, diskette \$55

"Effective Fortran" by Michael Metcalfe, Oxford University Press 1985 \$44

"Fortran Optimization" by Metcalf, Academic Press, 1985

"Introduction to the Graphic Kernel System" by Hopgood et al, Academic Press 1986 \$63

"Computer Graphics Programming GKS the Graphics Standard" by Enderle et al, Springer Verlag 1987 \$118.50

"High Resolution Computer Graphics using FORTRAN77" by Angell and Griffith, MacMillan \$42

"Computer Graphics Systems & Concepts" by Salmon and Slater, Addison Wesley 1987 \$45

"FORTRAN 8x - June 1989" - the current proposed standard \$35 postpaid

LAHEY SUPPORT

Lahey Computer Systems is a leader in customer support. If you have a bug or problem which cannot be resolved by Computer Transition Systems then the technical personnel at Lahey can be easily contacted - phone: (702) 831 2500, TELEX: 9102401256, and FAX: (702) 831 8123. The latter is effective for communicating involved technical questions and short bug examples. Lahey also maintain a users bulletin board (702) 831 802) which contains the latest FIX files for their various compilers as well as useful material contributed by Lahey users.

COMPILER UPDATES

Free updates are available for all Lahey compilers purchased from Computer Transition Systems. To obtain an update you must:

1. Supply a floppy disk with a label giving your serial number and the date of the .FIX file of your most recent copy
2. supply return postage
3. supply packing material preferably a preaddressed disk mailer.

Failure to adhere to the above procedure will likely mean your update request will not be filled. Provision of free updates is a service which can only be maintained if those requesting the service make it as simple as possible for us. If return postage is not included disks will be mailed without postage. If update disks are received in damaged condition an update will not be provided. The most recent .FIX file dates are

LP77.FIX - 28 March 1989

F77L.FIX (F77L version 3) - 22 June 1989

F77LEM.FIX - 25 May 1989

F77L3.FIX (F77LEMEM/32 version 1) - 27 June 1989

MATH CHIPS - INTEL & WEITEK

As a service to its customers CTS can supply math chips at competitive prices if payment is received with 7 days of supply of goods. Tax free prices as of early September 1989 are:

80287-6 \$225, 80287-8 \$350, 80287-10 \$380, 80287 12MHz \$440, 80387SX \$525, 80387-20 \$700, 80387-25 \$925, 80387-33 \$1200, mw1167-16 \$940, mw1167-20 \$1340, 3167-20 \$1340, 3167-25 \$1740, and 3167-33 2285. The daughterboards which allow both Weitek and 80387 chips to be used where only the Weitek socket is provided are \$225.

F77L SUPPORT PRODUCTS

Unless specifically noted the FORTRAN libraries listed here require the use of a math coprocessor and are not compatible with F77LEM. At present the only software normally stocked by Computer Transition Systems are Lahey products, HGRAPH, SCIPLOT, TEKMAR, Connel Graphics, VPLOT, I/O PRO, .RTLINK, VECTOR87, FOR_C, FORCHECK, Overlay Checker, and Documenter. Delivery time for other products is about three weeks after receipt of order. Prices are based on the dollar being worth at least seventy five cents U.S. Technical support for non Lahey items will only be available from the originators of the programs. Demo disks for the software listed below that are marked with a "D" will be provided to customers who send us diskettes and return postage.

LEGEND

D - demo disk available

L - more extensive information is available on request.

N - no royalty on compiled programs incorporating portions of the library

R - a royalty is levied on software using any portion of the library

S - source code is included

* - available for other FORTRANs (some also for C and Pascal)

LAHEY PRODUCTS

F77L - The FORTRAN77 Compiler for MS/PCDOS \$800 (educational institution price \$560). The cost to upgrade version 3 to version 4 is \$200. The cost to upgrade earlier versions of F77L to version 4 is \$240. Old manuals and distribution disks must be sent to us in order to obtain the upgrade.

F77L-EM/16 - FORTRAN77 Compiler for 80286 and 80386 hardware which permits programs of up to 15MB without overlays. \$1220 (includes DOS extender). Educational institution price \$990

F77LEM/32 - FORTRAN77 compiler for large programs optimised for 80386 computers. Programs compiled under F77LEM/32 execute twice as fast as F77L programs. \$1430 (includes DOS extender). Educational institution price \$1180

OS/x86 DEVELOPERS KIT - AI DOS extender operating system kit. This product is used in place of the normal DOS extender for F77LEM/16 or F77LEM/32. It is necessary when using extended memory FORTRAN with other languages. The cost is \$400 if purchased with F77LEM compilers. The individual price is \$660.

PLINK86+ - Lahey Version - an F77L linker for single level of overlays (code only) \$110. \$65 if ordered with F77L.

ULI LIBRARY - a very complete mathematical function library for F77L \$330. \$275 if ordered with F77L. F77LEM/16 version \$400. F77LEM/32 version \$470.

SPINDRIFT LIBRARY - The utility library from Spindrift Labs. This library is used by more than 10% of Australian F77L customers. F77L version \$200, F77LEM/16 version \$330, F77LEM/32 version \$395.

LAHEY PERSONAL FORTRAN \$140 - FORTRAN77 compiler with 64K limits. Educational institution & student price \$120.

PERSONAL FORTRAN TOOLKIT \$60 - Optional extras for Personal Fortran.

GENERAL UTILITY LIBRARIES

SPINDRIFT LIBRARY - DNL*

\$200 for F77L, \$235 for other MSDOS FORTRAN compilers. Versions for F77LEM/16 and F77LEM/32.

I/O PRO - DNL*

\$240. I/O PRO is a superset of the NO LIMIT library of 126 routines which provides screen graphics (EGA, CGA, Hercules), file management, character manipulation, very fast I/O, and other capabilities. Additional capabilities provided by I/O PRO include a comprehensive screen generation facility.

ForGe - NL*

\$610. ForGe is a general utility library with more than 250 routines for string handling, searching, sorting, printer handling, data encryption, spawning an interactive subprocess, C-like file handling procedures, calendar functions, bit manipulation, and screen handling including coloured popup menus, scrolling dialog windows, and data entry validation.

GRAPHICS LIBRARIES

HGRAPH - DNL*

\$185 HGRAPH is library which permits fast, interactive 2D and 3D scientific graphics. Plotters, dot matrix printers and the most common graphics cards (including Olivetti M24 and VGA) are supported by means of external drivers. A VAX version is available. F77LEM/16 and F77LEM/32 versions are \$210 each.

UGRAPH - DNL

\$475 Anticipated release November 1989. UGRAPH is a scientific graphics editor for 2D and 3D graphics. Information may be input from data files, from HGRAPH archive files, or from the inbuilt interpreter. UGRAPH can produce Postscript and TIFF files for inclusion in many desktop publishing packages.

SCIPILOT - NL*

~~\$200~~ Sciplot is a CALCOMP-like two dimensional Fortran graphics subroutine library. Compatible with CGA, Hercules, EGA, PGA, VGA, Graphics Master, Epson printers, Apple LaserWriter, HP Laserjet, HP Plotters, and MS Mouse. Optional support products include custom font generation, digitiser support, and interpolation software. An F77LEM/16 version is available. (\$230)

INDOGKS - LD

\$350 INDOGKS is a level 2b GKS graphics library with drivers for EGA, CGA, Hercules, Epson printers, IBM Graphics Printers, and HP Plotters.

HISCREEN XL - DNL*

\$475 professional version. \$235 standard version. HISCREEN XL allows interactive design of screens and windows for almost any language. Can be used for menu systems and data entry screens.

PLOT88 - DNL*

\$440 PLOT88 is compatible with CGA, Hercules, EGA, VGA, Epson Printers, IBM Graphics Printers, HP plotters, IBM Color Plotters, HI Plotters, Enter Plotters, and HP printers. PLOT88 is an execelent library for the production of high quality contour plots.

CONNELL GRAPHICS - DNLS*

\$375 Connell Scientific Graphics produces graphics for EGA and 16 colour VGA which execute extremely quickly and are very compact. A printer driver package is also available (\$120). Interfaces to F77L, M/S FORTRAN & C, QuickBasic, and TurboPascal are provided.

GSS GDT & GKS - LR*

~~\$1050~~ each. Graphics Development Toolkit and GKS are standard graphics packages produced by GSS. Drivers for over 250 devices are included. Drivers may also be obtained separately for \$110 each volume.

METAWINDOW - DNL*

\$440 Metawindow supports over forty video cards including the Olivetti M24. The most common C and Pascal compilers are supported. Call for FORTRAN availability. Metawindows provides very fast flexible windows in which graphics and text may be displayed. The only hardcopy support is dot matrix printers.

F PLOT - LN

\$99 FPLOT is a plotter emulator which allows dot matrix and laser printers to act as an HP pen plotter. Also included is VPLOT, a memory resident utility which permits HPGL files to be written by many applications (eg LOTUS 123) which are not normally able to produce HPGL files. Provision is made for preview of plots on Hercules, CGA, EGA, or VGA displays.

TEKMAR - D2LN*

\$330 TEKMAR is a comprehensive FORTRAN graphics library for the EGA card. Features include windowing, viewposting, clipping, axis rotation, screen dump, and restore. TEKMAR is written in assembly language and FORTRAN to provide maximum speed, portability, and flexibility. A F77LEM/32 version is planned.

GRAPHMATIC PRINTMATIC & PLOTMATIC - DNL*

\$410 for any two of Graphmatic, Plotmatic, and Printmatic. \$540 for all three. Graphmatic is a screen graphics package compatible with the Hercules monographic card, the colour/graphics card, or EGA card. Plotmatic is a pen plotter package for HP or Houston Instrument plotters. Printmatic is a dot matrix printer package. A Font Module provides many additional characters (\$85).

INGRAPH - DNLS*

\$385 INGRAPH is a graphics package with HP plotter, CGA, Hercules, and EGA video support. Call for availability.

GEOGRAF - RL*

\$495 GEOGRAF is a CALCOMP-like graphics library which supports CGA, EGA, Tecmar, and Hercules cards (check on others); HP, HI, Zeta, 7321, 7322 and Sweet Pea plotters; and most dot matrix printers.

PLOTDEV - RL*

\$80 from Peter Elford, 7 Elinga St., Jindalee, Qld 4074 (07) 3761267. PLOTDEV provides Tektronics 4010 or 4027 graphics emulation on CGA, Hercules, EGA, PGA, M24 (640x400), DG1, and UltraPak cards and most EPSON compatible printers as well as the HP LaserJet.

MATHEMATICAL AND STATISTICS LIBRARIES

PL1250 - NL*

\$3950 PL800 is \$2950. The PL1250 is a 32bit floating point array processor for IBM PC and AT compatible computers. Processing speed is 12.5 MFLOPS. The PL800 library contains over 470 subroutines including FFT, Bi-quad filtering, correlation, convolution, moving average filtering, noise spectrum equalisation, integration, interpolation, polynomial evaluation, linear equation solution, Laplacian filter, median filter, edge enhancement filters for image processing as well as a wide range of vector and matrix operations. In addition to F77L interfaces are available for other MSDOS FORTRANs, Lattice C, TurboPascal, TurboC, and Microsoft C. Call for availability of UNIX compatibility.

THE SCIENTIFIC DESK - D2RL*

\$520 The Scientific Desk is a large library of math and statistical subroutines prepared by a former president of IMSL. About half of these have been developed from the best mainframe routines in packages such as SLATEC, LINPACK, EISPACK, QUADPACK, and FNLIB. A A F77LEM/32 version is available.

MATHPAK 87 - NLS*

\$200 \$290 with source code. MATHPAK 87 is a set of double precision subroutines for vector and matrix operations, FFT, data fitting, solution of linear equations and spectral analysis. More extensive than VECTOR87.

VECTOR87 - NLS*

\$210 Vector87 is a set of assembly language subroutines which reduce the execution time of programs by a factor of 2 to 18. Application areas include geophysical processing, time series analysis, numerical analysis, statistics, linear algebra and matrix calculations.

NUMERICAL RECIPES - NLS*

Book \$89.50 Disk \$55 While not as extensive as NAG or IMSL the 202 mathematical routines contained in "Numerical Recipes" by Press et al., Cambridge University Press 1986 are a worthwhile alternative. The book was reviewed in the January 1987 issue of Byte (pg 65). A C version is also available.

PCBLAS - LS*

\$75 PCBLAS is a subroutine library which carries out matrix operations and is particularly useful with EISPACK and LINPACK.

M2SL - L*

\$140 from Microstat Software, P.O. Box 125 Queanbeyan, NSW 2620 (062) 972697. M2SL is subroutine library which provides routines for statistical distributions and matrix operations.

FREE DISK

Various users have contributed useful utilities for general distribution. Some of these have been obtained from the Lahey Bulletin Board but most come directly from Australian FORTRAN users. Included on the free disk are a set of extended precision mathematics routines in FORTRAN which give about the same accuracy as quadruple precision in VAX VMS FORTRAN, a FORTRAN source code tidier, a program mapper which produces the call structure of a program, an example of how to use interrupts with F77L, peek and poke routines, a set of statistical distribution functions, a Summigraphics digitizer routine for F77LEM/32, music routines, and a method for opening more than 20 files. The free disk is available on a 1.2 MB or 1.44 MB diskette from Computer Transition Systems at no charge on the same basis as F77L updates.

NAG PC50 LIBRARY - RL*

\$600 from SIROMATH P/L, level 5, 156 Pacific Highway, St. Leonards, NSW 2065. The NAG library is one of the best known mainframe mathematics packages. PC50 is a subset of this library. A larger subset, the NAG WORKSTATION LIBRARY, has been released (\$1500).

FORTRAN SUPPORT PRODUCTS - N?L*

From Alpha Computer Service, P.O. Box 2517. Cypress, CA 90630. (714) 894 6808. - \$US70 Forlib Plus - graphics, communication and file handling libraries. - \$US295 Statistician - 300 mathematical and statistical FORTRAN subroutines with source code. - \$70 Strings and Things - String and utility library. - \$US\$495 ACS Time Series - a comprehensive time series analysis package.

PRIME FACTOR FFT - NL*

U.S.\$171 from Alligator Transforms, P.O. Box 11386, Costa Mesa, CA 92627 (714) 662-0660. Prime Factor FFT is a library of routines to calculate double precision inverse and forward FFT of real and complex data. Series length is arbitrary to 16,384.

PRODUCTIVITY TOOLS

FORCHECK - DLN*

\$590 (\$390 for version 8) FORCHECK is a comprehensive static analyser which is particularly useful for the development and maintenance of very large programs. FORCHECK is also available for popular mainframe Fortran compilers.

DOCUMENTER - LN*

\$190 DOCUMENTER is an effective utility for documenting large and/or highly structured programs. A utility for diagramming the structure of a program is also included. These utilities were originally written by a Fortran development group for their own use.

AUTOMATED PROGRAMMER - NL*

\$850 The Automated Programmer automatically generates FORTRAN programs from computational formula and algorithms directly entered from books or other reference sources. This approach greatly speeds up program development and substantially reduces the incidence of coding errors.

OVERLAY CHECKER - NL

\$40 The Overlay Checker examines source code to see if a specified overlay scheme is valid. This utility is essential for those who are designing overlaid programs. The present version does not support ENTRY statements.

PC-FORTRAN TOOLS & PC-OVRLAY - NL*

\$265 FORTRAN TOOLS is a set of tools created by software developers for their own use in maintaining and porting Fortran software. Included are a comprehensive global cross reference facility, a source code beautifier, and a utility which breaks up large programs into their constituent subroutines, functions and block data. PC-OVRLAY (\$150) is a utility which examines a source file and then creates the optimal overlay structure for that source. PC-TOOLS are required in order to use PC-OVRLAY.

TLIB - LN

\$140 TLIB is a fast, powerful, easy to learn and use, version control system. Numerous improvements have been made to the program since it was very favourably reviewed in PC Tech Journal (Sept 1987).

POLYHEDRON SOFTWARE - DNL*

Polyhedron has developed several tools for both microcomputer and mainframe environments. They should be of interest to developers of complex software. A demonstration disk illustrating all Polyhedron products is available together with additional printed information. The entire suite of Polyhedron software costs \$2270 for MSDOS.

- **SPAG** \$1660 SPAG reorganizes "spaghetti" source code into a logically equivalent but clearly structured form.
- **CRAM** \$610 CRAM is a fully automated overlay designer.
- **CMAKE** \$210 CMAKE automatically generates dependency data. For instance when an include file is changed CMAKE can be used to force recompilation of all files depending on the include file.

- **QMERGE** \$210 QMERGE simplifies the problem of coping with programs which exist in several versions. It allows the source code for several versions of a program to be kept in one place and provides a mechanism for commenting out sections of code appropriate to a particular version of a program.

POLYTRON PRODUCTS - NL*

Computer Transition Systems is now able to supply the whole range of programming tools from Polytron. Further details are available on all of these products. Those which should be of interest are:

- **POLYBOOSTII** \$135 Polyboost is a utility which speeds up disk access by means of a disk cache (using conventional memory, expanded memory, or extended memory). It also provides faster screen display by sending text directly to the screen. The third major benefit provided by Polyboost is faster and enhanced keyboard I/O.
- **POLYMAKE** \$230 Polymake keeps track of which files depend on others and allows final programs to be updated with a single command when any of the modules comprising the program is changed.
- **POLYLIBRARIAN** \$230 Polylibrarian is an important tool for people who frequently work with a large number of object modules. Polylibrarian is much more powerful than the Microsoft Librarian.
- **PVCS** \$560 (Personal version \$230) PVCS is a version control system modeled after those used in mainframe software development environments. PCVS is an essential tool for complex software development especially when several programmers are involved.
- **POLYDOC** \$300 POLYDOC is a tool which scans comment lines in source code files and prepares organised documentation from this information.

BRIEF EDITOR NL*

\$335 Brief is a powerful yet easy to use editor for program and data file editing. Programmable customization, keystroke returns, edit unlimited file size and multiple windows are supported.

MISCELLANEOUS PRODUCTS

RTLINK NL*

\$430 RTLINK is a linker capable of complex overlaying and is suitable for virtually every MSDOS compiler which produces .OBJ files. In addition it can do run time linking which results in substantially smaller .EXE files and faster software development. It also has profiler capability and the user can list out the relationships and dependencies between modules. Users of Microsoft LINK or PLINK86+ will find RTLINK easy to learn and use.

PLINK 86+ NL* - not recommended - RTLINK is better

~~\$600~~ \$530 Plink86+ is a linker capable of complex overlaying. A version of PLINK86+ which handles only one level of overlaying (code only - not data) is available from CTS for \$110.

FOR_C - DLN*

\$1220 This utility translates FORTRAN77 source code into ANSI C. Output is optimised for readability. Included are runtime libraries with complete C source code for FORTRAN library, I/O, character and complex data. XENIX/386 version is \$1350. FOR_C++, a product which translates FORTRAN into C or C++ is available for Xenix/386 (\$2520) and SUN-3 (\$3000). Poorly structured FORTRAN code should be processed by a product such as SPAG (or FOR_STRUCT - release due in November 1989 - \$1140) before translating into C.

F PLOT - LN

\$99 F PLOT is a plotter emulator which allows dot matrix and laser printers to act as an HP pen plotter. Also included is VPLOT, a memory resident utility which permits HPGL files to be written by many applications (eg LOTUS 123) which are not normally able to produce HPGL files. Provision is made for preview of plots on Hercules, CGA, EGA, and VGA displays.

BTRIEVE - NL*

\$350 Btrieve is a database management module. The Microsoft assembly language version can be incorporated into F77L programs.

BTRIEVE INTERFACE - NL*

\$110 BT-F77L provides example programs which can be immediately used as templates for any database function one might wish to construct. Normally the only changes a programmer will make to the example code is to alter the names of the functions to those appropriate to the application.

GLENCO Engineering Libraries - DNL*

Eight libraries (Windows, BIOS, Communications, File Operations, DOS, Data Entry Windows, Network Tools, and Encryption) from Glenco Eng., 3920 Ridge Ave, Arlington Hts, IL 60004. (312) 392 2492.

FRAMEDIT - DNL

\$200 FRAMEDIT is a screen definition system and screen library from Cadro P/L, 1 Florizel St., Burwood, Vic 3125 (03) 299 2921

VDM - DNL

\$300 The Virtual Data Manager (VDM) is a library which allows programs to place single dimensional arrays in external memory (ram disks or disk drives). It can eliminate the need for an overlaying linker.

RTFILE - NL*

\$750 from Charmill Management Systems, P.O. Box 419, Emerald, Qld 4720 phone (079) 82 1546. RTFILE is an interactive database management system. FORTRAN can be used in conjunction with it to develop specialised application software.

ASMTREE - NLS*

\$630 ASMTREE is a complete multiuser database development library in assembly language. Up to 256 index and data files are supported.

PDQHELP - DNL*

\$80 PDQHELP is an online help utility requiring 29K of memory. It provides the user with instant access to as much information as can fit on a disk.

SPACEMAKER - N*

US\$75 from Realia, 10 South Riverside Plaza, Chicago, Ill, 60606 (312) 346 0642. VISA accepted. Spacemaker is a utility to compress the size of executable fortran programs.

NECIII & APRICOT 8087 ERROR HANDLER

\$40 A customer has developed software for the NECIII and the Apricot which prevents the machine hanging up when the 8087 is in an error condition. The routine is simply installed via an entry in your AUTOEXEC.BAT file.

OPT TECH SORT - NR*

\$US171 from Opt Tech. P.O. Box 670, Zephyr Cove, Nevada 89488, (702) 588 3737. Opt Tech Sort is a utility written in assembly language which allows data files to be sorted and merged.

RF77 - NL*

US\$72 from Logical Developments, P.O. Box 55798, Houston, Texas 77255. RF77 is a modernized Ratfor translator.